OPERATING SUMMARY

SIMCOE

water pollution control plant

1967

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET, TORONTO 5
OFFICE OF THE GENERAL MANAGER

Members of the Simcoe Local Advisory Committee,
Town of Simcoe.

Gentlemen:

We are happy to present you with the 1967 Operating Summary for the Simcoe Water Pollution Control Plant, OWRC Project No. 2-0120-62.

Your co-operation with our staff throughout the year has been appreciated. Only with such co-operation can the war against water pollution be waged effectively.

Yours very truly,

D. S. Caverly,
General Manager.

#1

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Simcoe Water Pollution Control Plant, OWRC Project No. 2-0120-62.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

CONTENTS

SIMCOE
water pollution control plant

operated for

THE TOWN OF SIMCOE

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

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DIVISION OF PLANT OPERATIONS

DIRECTOR: D. A. McTavish

Assistant Director: C. W. Perry
Regional Supervisor: P. J. Osmond
Operations Engineer: R. E. Brown

801 Bay Street Toronto 5

'67 REVIEW

The total operating cost for 1967 was $45,987.82 as opposed to $42,874.24 in 1966. There was a slight decrease in the total flow to the plant from the 628.39 million gallons treated in 1966. This reflects an increase in cost per million gallons to $74.04 from $68.23 in 1966.

A total of 621.104 million gallons of raw sewage was treated, representing a decrease over the previous year. In 1967, the total design hydraulic capacity at the two plants was exceeded 20% of the time as compared to 16% of the time in 1966 and 10% of the time in 1965.

The average BOD of 41 raw sewage samples was 267 ppm and the average suspended solids was 184 ppm. The average final effluent BOD of both plants was 9.4 ppm representing average removal efficiencies of 96.5%. The average effluent suspended solids was 11 ppm for an efficiency of 94%. There was not any significant change in the average organic concentrations to the plants over 1966. However, the concentrations were 121% of the design value. On the average of the year's results, the effluent met OWRC objectives for both plants.

In 1966, a partial renovation of the aeration equipment in Plant No. 1 was completed. Utilizing used diffuser equipment, one pass of the aeration section of this plant was modified to a Sparjer installation. In addition, one of the blowers was rebuilt with a resultant increase in efficiency. Present plans are to discontinue the renovation of the aeration section until a source of used Sparjers can be located. The second blower was rebuilt in 1967 completing that part of the renovation.

Operating costs in 1967 were very close to the anticipated operating budget with the exception that rehabilitation of the clarifiers at the old plant

was charged to operating rather than the reserve account as planned. High chlorine use was continued in an effort to relieve the odour problem which has given rise to complaints from residents in the south end of Town. Some success was achieved with the chlorine. However, since the cause of the odour is from canning wastes, particularly beans in the raw sewage, it is advisable that the problem be attached at its source.

A new preventive maintenance program was initiated at the plant during 1966. With increased experience and education of the plant staff, the maintenance program became very effective during 1967. The Simcoe plants present a slightly more complex maintenance problem than is normally anticipated due to the large variety and number of different pieces of equipment associated with the two separate plants.

There are two continuing equipment problems at the Simcoe plant which, although not of a critical nature, are worthy of note. Firstly the boiler presently at the plant is undersized for the existing application. Any future extension at the plant should include a new boiler of sufficient size to overcome the large heat losses between the control building and the digester. The second problem concerns the chlorine facilities. The chlorine building and associated equipment was part of the original installation on plant No. 1. The building itself does not provide adequate storage facilities for the chlorine and, as has been pointed out by our Safety Officer, is unsafe. The chlorinator itself is the old bell jar type and does not provide an accurate control over chlorine dosages. During the period when large quantities of chlorine were being used for odour control, it was not capable of delivering sufficient chlorine to the raw sewage wet well. When plant expansion is contemplated consideration will be given to the installation of a new chlorine storage building and associated equipment. Some modifications have been carried out to increase the usefulness of the facility until a new one can be built. It may be necessary to replace the chlorinator on an emergency basis if the existing one fails.

The plant staff consisting of a chief operator, two operators and one groundskeeper operator together with OWRC head office staff were successful in operating two plants which maintained an effluent quality within OWRC objectives.

PROJECT COSTS

NET CAPITAL COST (Estimated)		$694,205.44
DEDUCT - Payments from Municipalities	$ 37,795.29	
- Portion Financed by CMHC (Estimated)	409,699.75	447,495.04
Long Term Debt to OWRC		$246,710.40
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967		$ 25,839.93
Net Operating		$ 45,987.82
Debt Retirement		4,979.00
Reserve		6,043.87
Interest Charged		13,912.84
TOTAL		$ 70,923.53

RESERVE ACCOUNT

Balance at January 1, 1967	$ 17,066.94
Deposited by Municipality	6,043.87
Interest Earned	1,100.02
	$ 24,210.83
Less Expenditures	-
Balance at December 31, 1967	$ 24,210.83

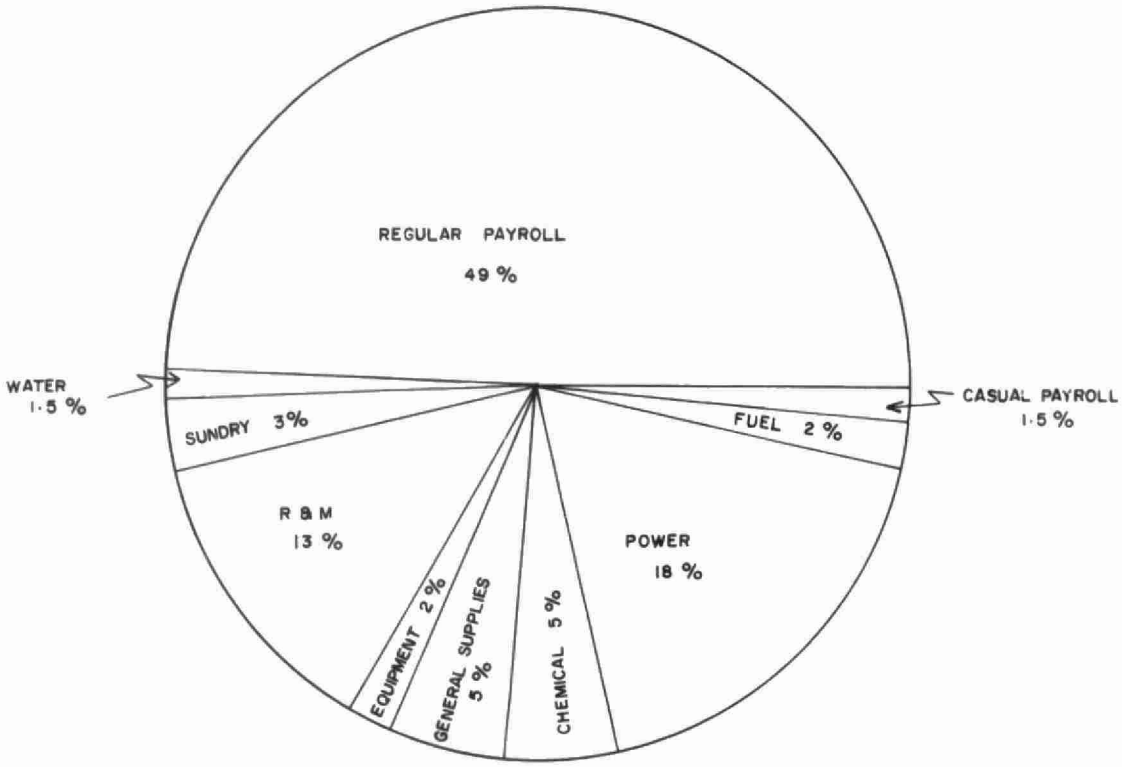
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	2,600.06	1,639.30		74.50	708.17		92.73	10.69	49.84		24.83
FEB	2,920.91	1,597.60		96.85	669.86		184.12	134.95	162.94	41.57	33.02
MARCH	4,132.68	2,757.99		194.60	605.84		193.37	20.18	258.71	94.47	37.52
APRIL	3,123.24	1,765.17		75.54	769.85		218.01		203.37	49.28	42.02
MAY	3,708.17	1,870.27		53.49	857.86	98.28	253.87	178.58	291.43	35.37	69.02
JUNE	3,376.86	1,750.52			811.44		283.47	214.69	194.70	62.02	60.02
JULY	3,738.22	1,721.88	240.00		629.85	342.56	168.22	135.00	357.70	82.99	60.02
AUG	4,591.27	1,796.07	228.00		531.84	685.12	83.59	111.30	1,022.97	72.36	60.02
SEPT	4,648.96	2,593.24	143.52		687.76	342.56	162.08	137.58	488.22	42.98	51.02
OCT	3,704.98	1,727.00			661.78	781.25	87.45		347.82	39.66	60.02
NOV	3,933.71	1,754.05		172.42	560.21		276.12		321.85	798.04	51.02
DEC	5,478.76	1,723.03		228.36	725.93		233.16	18.06	2,345.85	144.35	60.02
TOTAL	45,987.82	22,696.12	611.52	895.76	8,220.39	2,249.77	2,236.19	961.03	6,045.40	1,463.09	608.55

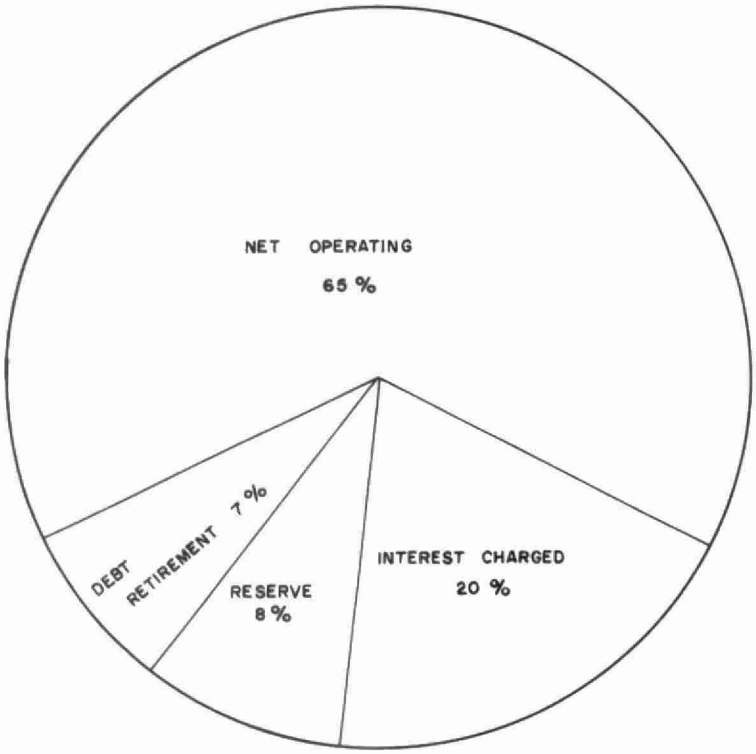
YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1964	485.209	$33617.36	$69.06	2 CENTS
1965	565.531	40334.44	71.32	2 CENTS
1966	628.389	42874.24	68.23	3 CENTS
1967	621.104	45987.82	74.04	3 CENTS

1967 OPERATING COSTS



TOTAL ANNUAL COST



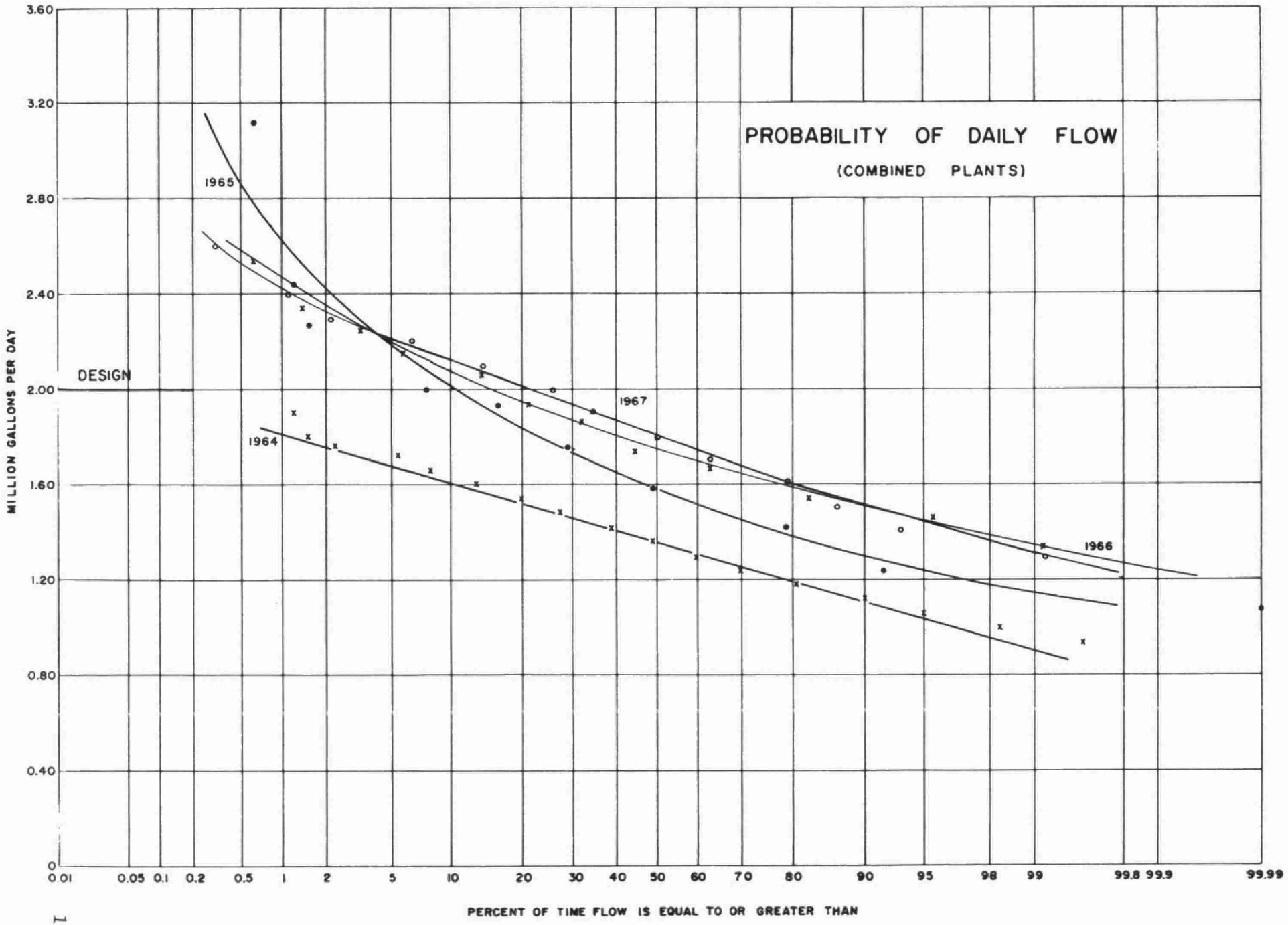
Process Data

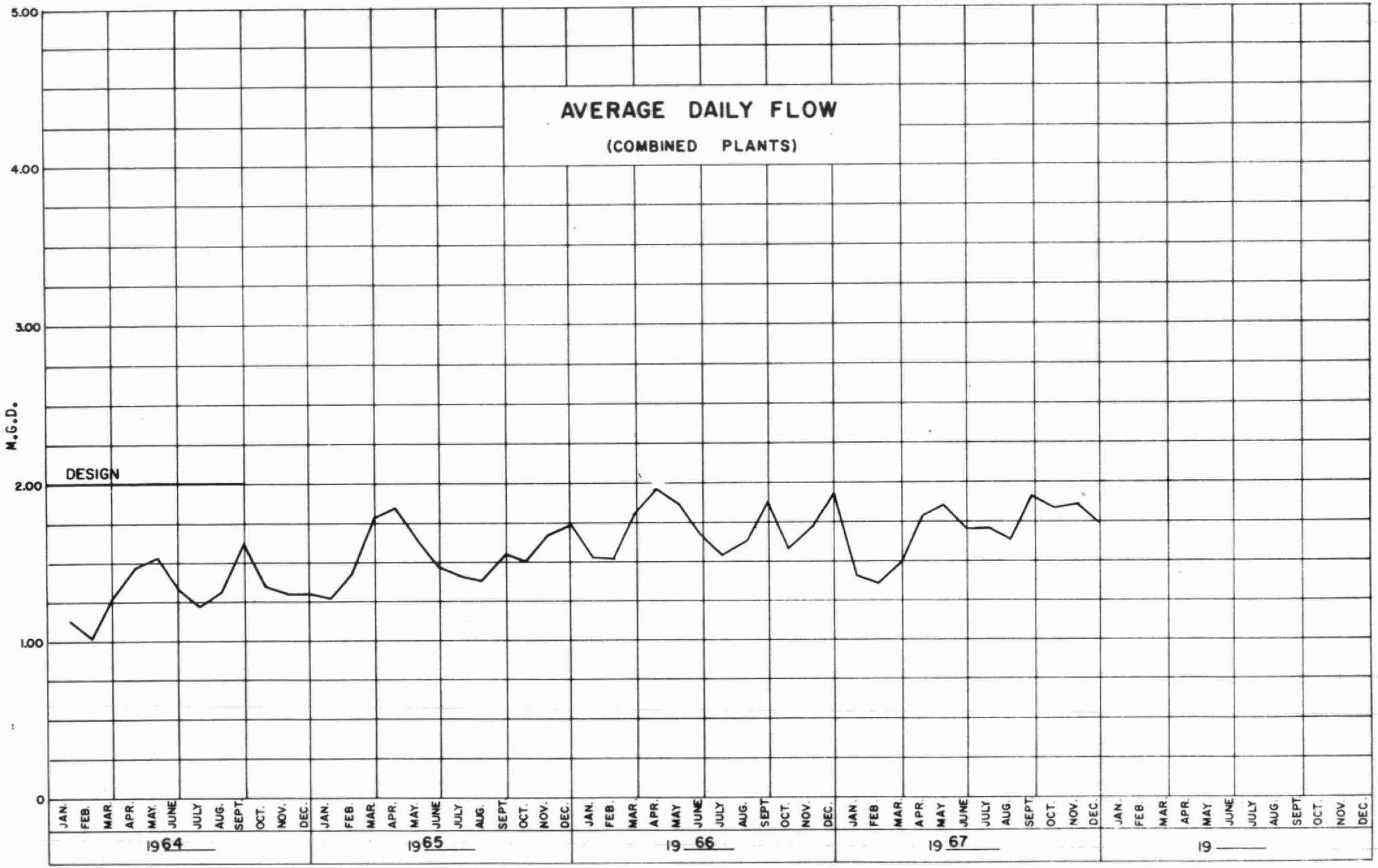
A total of 621.104 million gallons of raw sewage was treated at the Simcoe plant during 1967. This represents a 1.2% decrease from the previous year. The average daily flow for the year was 1.702 million gallons which yields a load factor on the combined plants of 85%. The maximum daily flow for any one day during the year was 2.566 million gallons and occurred in May.

On a yearly average, Plant No. 1 accepted 19% of the total flow and Plant No. 2 accepted the balance of 81%. In 1967 the total design capacity of the two plants was exceeded 20% of the time as compared to 16% of the time in 1966, and 10% in 1965.

GRIT REMOVAL COMBINED

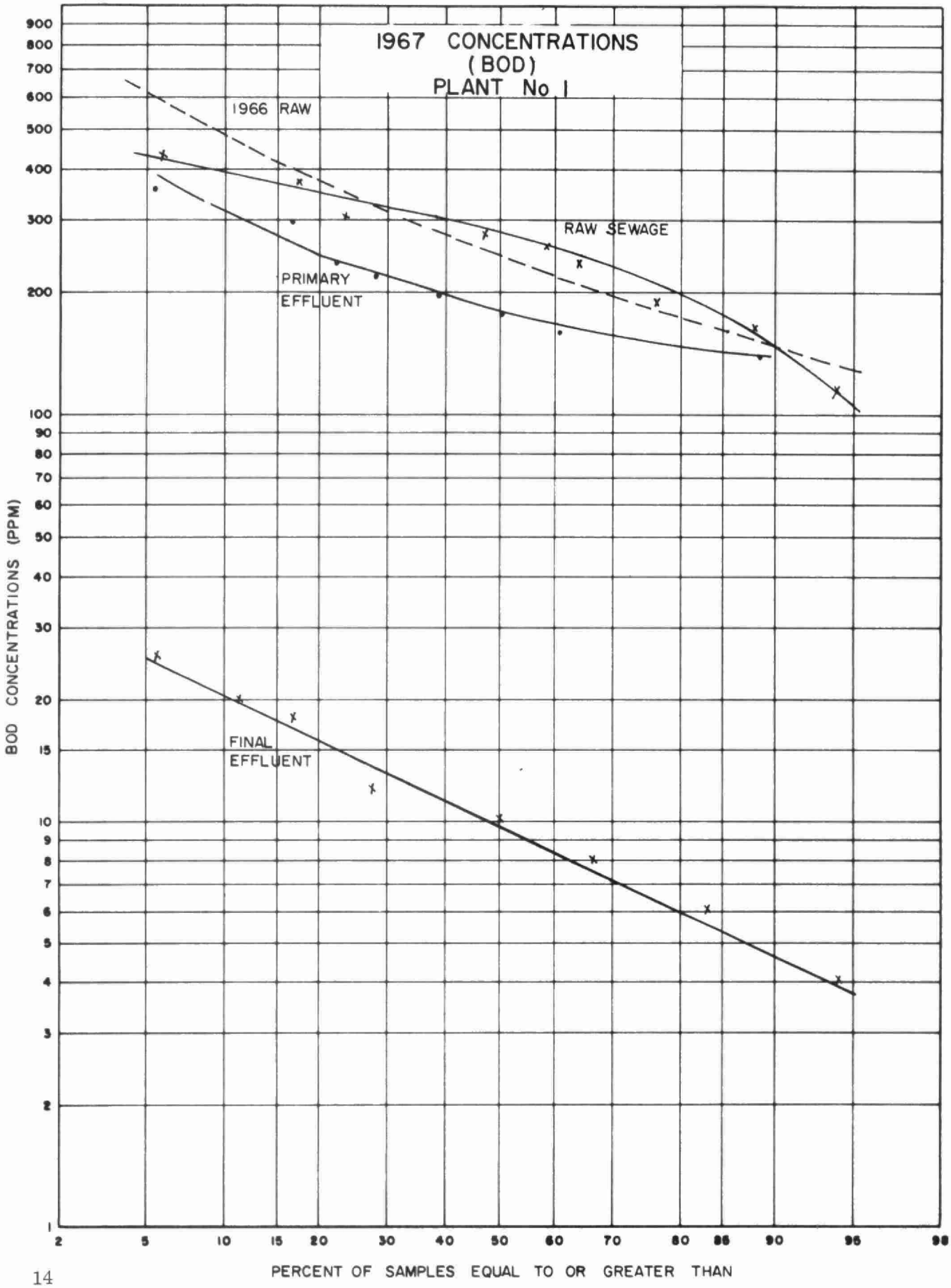
Grit removal totalled 431 cubic feet for the year for an average monthly removal of 36 cubic feet. On the basis of raw sewage flow, the average of 0.7 cubic feet per million gallons is within the range normally anticipated. This value has decreased considerably since 1964 indicating a reduction in the percentage of infiltration and storm water.


PROBABILITY OF DAILY FLOW
(COMBINED PLANTS)
MILLION GALLONS PER DAY
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
DESIGN
1965
1967
1964
1966
3.60
3.20
2.80
2.40
2.00
1.60
1.20
0.80
0.40
0
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99


AVERAGE DAILY FLOW
(COMBINED PLANTS)
M.G.D.
5.00
4.00
3.00
2.00
1.00
0
DESIGN
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1964
1965
19 66
19 67
19 ____

FLOW DATA

Month	Total Flow (MG)	Avg. Daily Flow (MGD)	Max. Daily Flow (MG)	Min Daily Flow (MG)	Total Flow #1 (MGD)	Total Flow #2 (MGD)
January	43.326	1.398	1.571	1.157	11.963	31.363
February	37.738	1.347	1.607	1.201	11.030	26.708
March	45.756	1.476	1.762	1.159	10.292	35.464
April	59.336	1.980	2.330	1.539	18.037	41.299
May	57.407	1.852	2.566	1.254	17.377	40.030
June	51.044	1.701	2.163	1.500	13.864	37.180
July	52.773	1.702	1.904	1.524	10.198	42.575
August	50.490	1.629	1.897	1.395	-	50.490
September	57.206	1.907	2.260	1.329	-	57.206
October	56.615	1.826	2.185	1.503	-	56.615
November	55.414	1.847	2.160	1.521	10.948	44.466
December	53.999	1.741	2.329	1.511	14.917	39.082
Totcl	621.104				118.626	502.478
Average	51.758	1.702			13.180	41.873


1967 CONCENTRATIONS
(BOD)
PLANT No 1
1966 RAW
RAW SEWAGE
PRIMARY
EFFLUENT
FINAL
EFFLUENT
BOD CONCENTRATIONS (PPM)
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
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30
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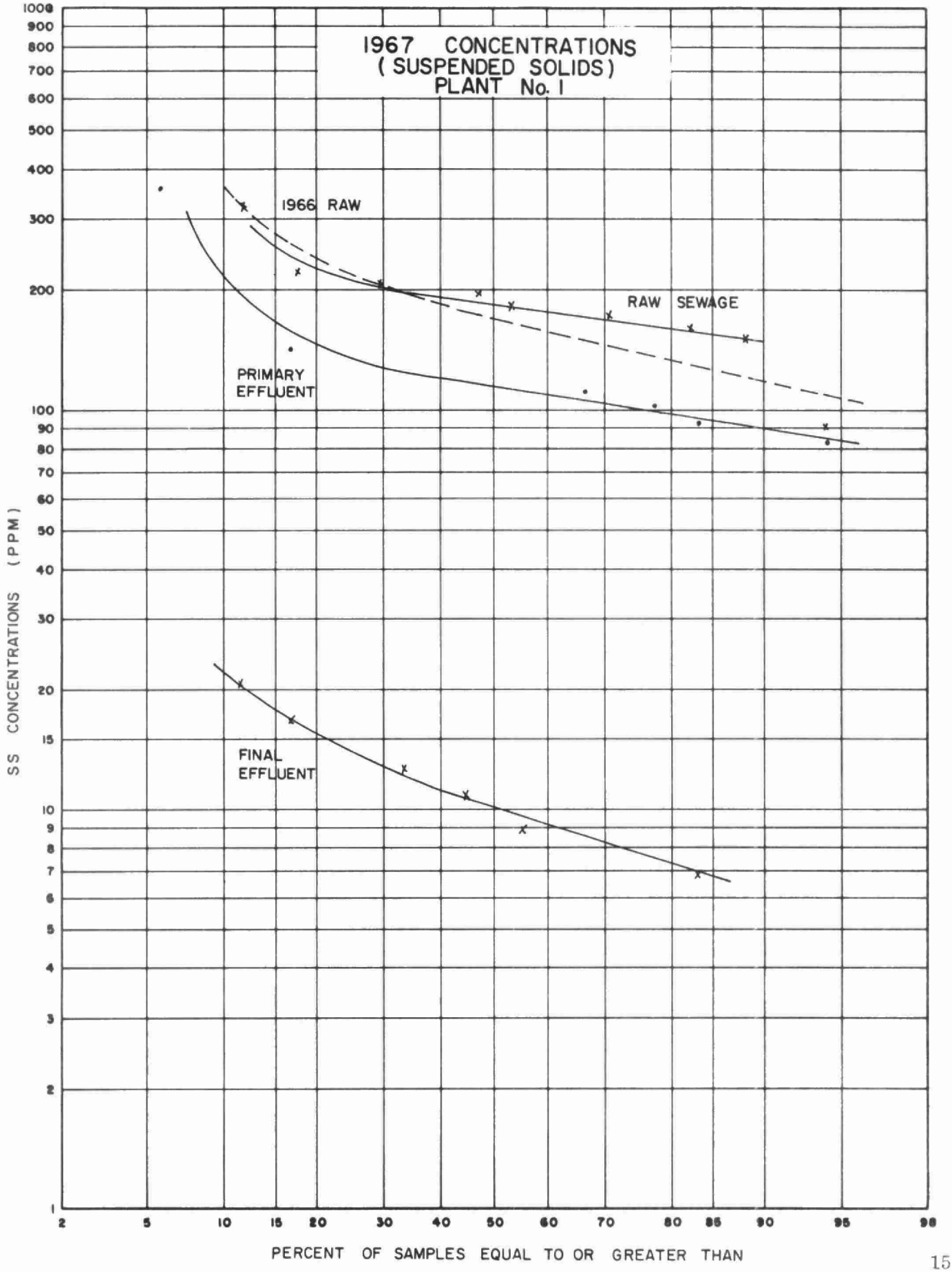
60
70
80
85
90
95
98


1967 CONCENTRATIONS
(SUSPENDED SOLIDS)
PLANT No. 1
1966 RAW
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
SS CONCENTRATIONS (PPM)
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
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90
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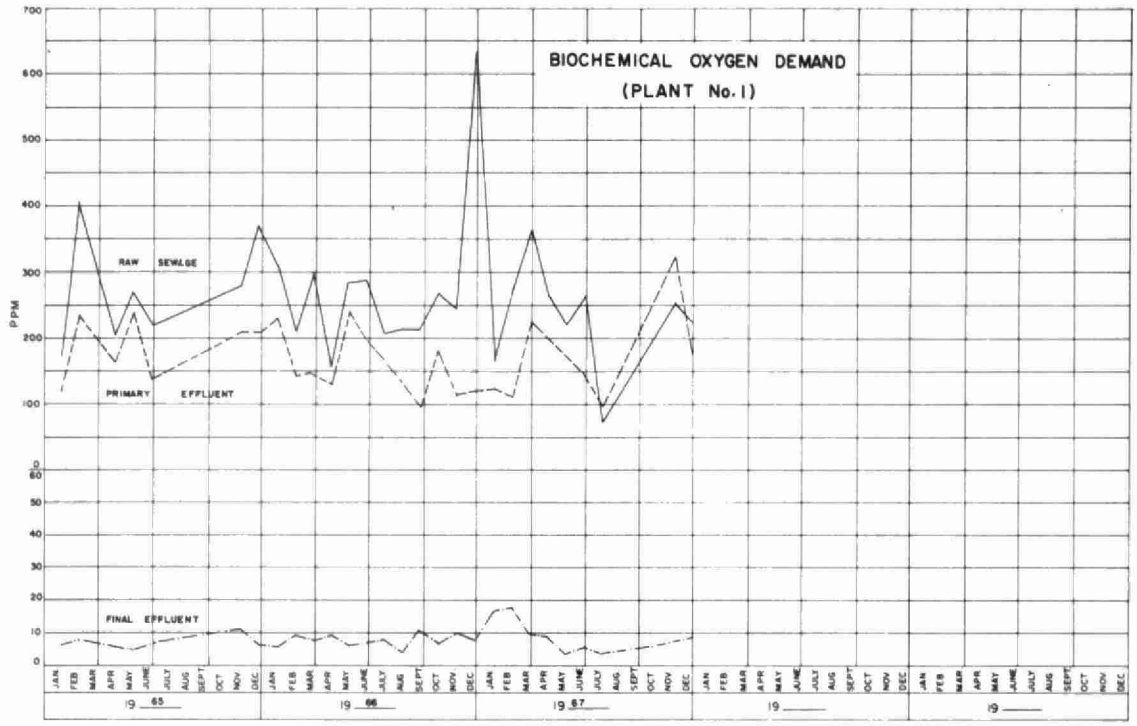
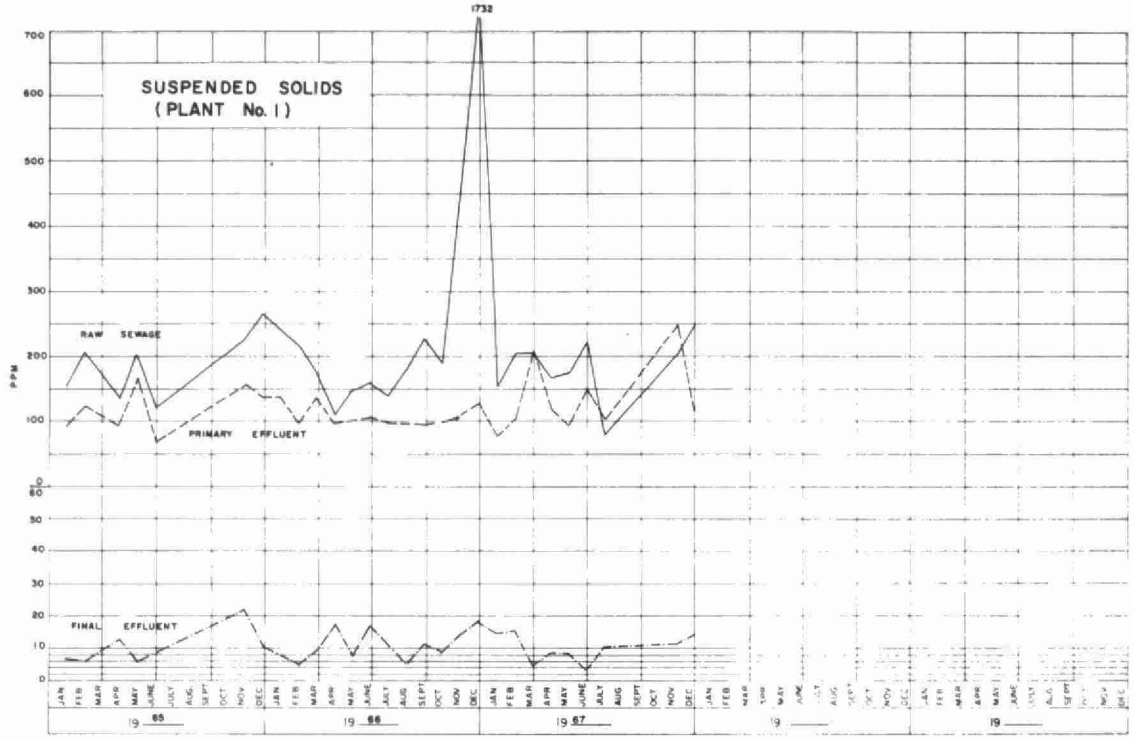
98
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



B.O.D AND S.S. REMOVAL

PLANT NO. 1

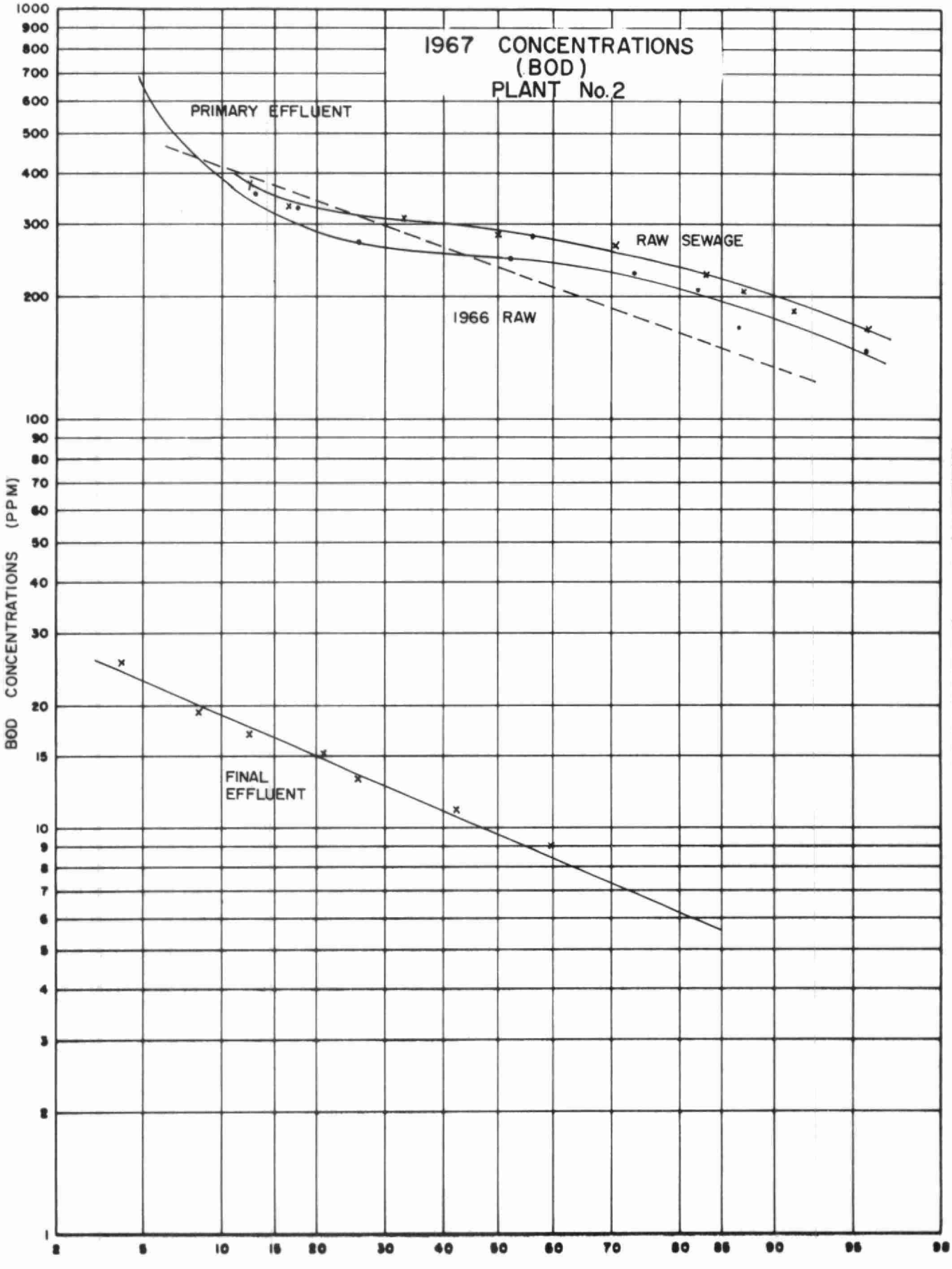
MONTH	B. O. D.				S. S.			
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED
JAN.	164	17	89.6	8.79	154	14	90.9	8.37
FEB.	279	18	93.5	14.39	205	15	92.7	10.48
MAR.	366	10	97.3	18.32	205	4.5	97.8	10.32
APR.	267	9.4	96.5	23.23	169	8	95.3	14.52
MAY	222	3.8	98.2	18.96	178	8	95.5	14.77
JUNE	267	6	97.8	18.09	222	3	98.6	15.18
JULY	76	3.6	95.3	3.69	80	10	87.5	3.57
AUG.	-	-	-	-	-	-	-	-
SEPT.	-	-	-	-	-	-	-	-
OCT.	-	-	-	-	-	-	-	-
NOV.	255	8.1	96.8	13.52	205	11	94.6	10.62
DEC.	225	8.6	96.2	16.14	253	14	94.5	17.83
TOTAL	-	-	-	135.13	-	-	-	105.66
AVG.	236	9.4	95.7	15.01	185	10	94.1	11.74

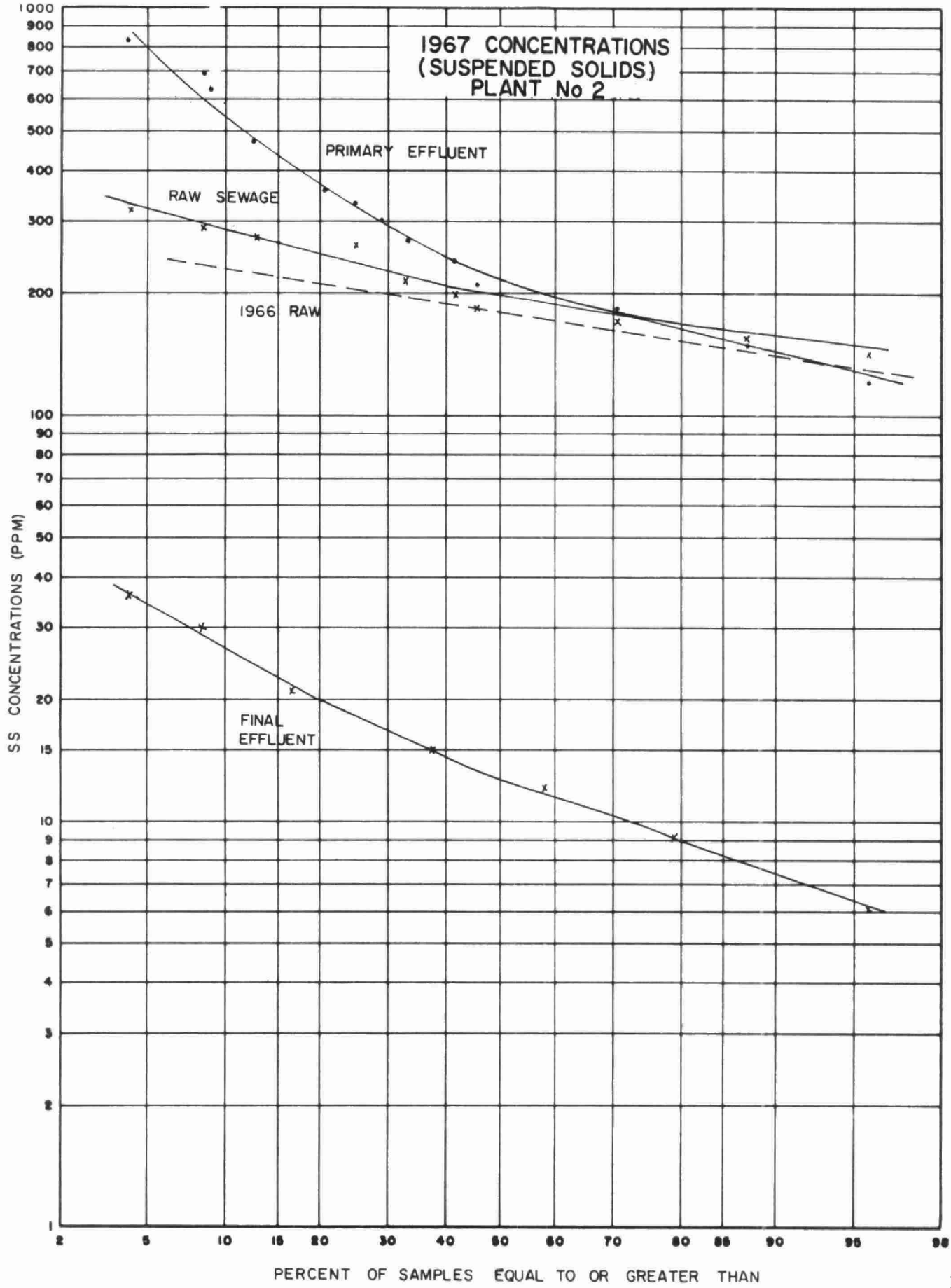
COMMENTS

An average strength in the raw sewage of 236 ppm BOD and 185 ppm SS was received at the old plant in 1967. The average effluent values of 9.4 ppm BOD and 10 ppm SS were within OWRC objectives of 15 ppm.

The BOD of the effluent exceeded the OWRC objective of 15 ppm only 23% of the time, and the suspended solids exceeded the objective 22% of the time.

This plant was out of operation for three months for renovations and painting.


1967 CONCENTRATIONS
(BOD)
PLANT No.2
PRIMARY EFFLUENT
RAW SEWAGE
1966 RAW
FINAL
EFFLUENT
BOD CONCENTRATIONS (PPM)
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN


1967 CONCENTRATIONS
(SUSPENDED SOLIDS)
PLANT No 2
PRIMARY EFFLUENT
RAW SEWAGE
1966 RAW
FINAL
EFFLUENT
SS CONCENTRATIONS (PPM)
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN
1000
900
800
700
600
500
400
300
200
100
90
80
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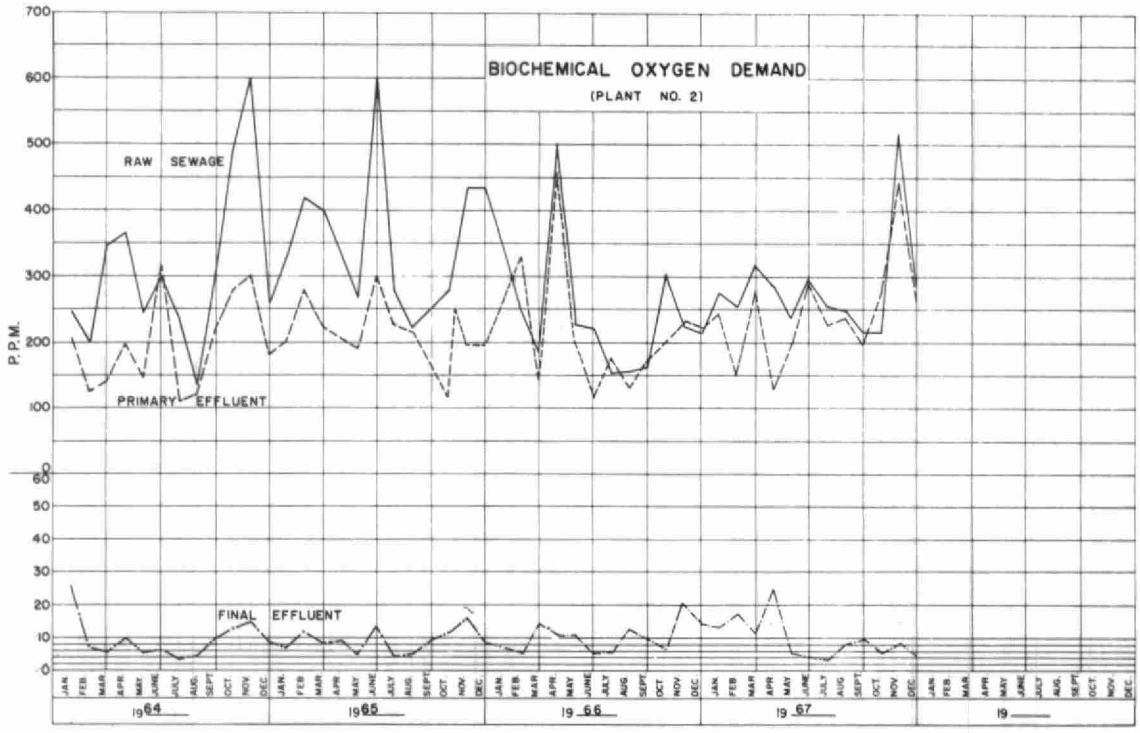
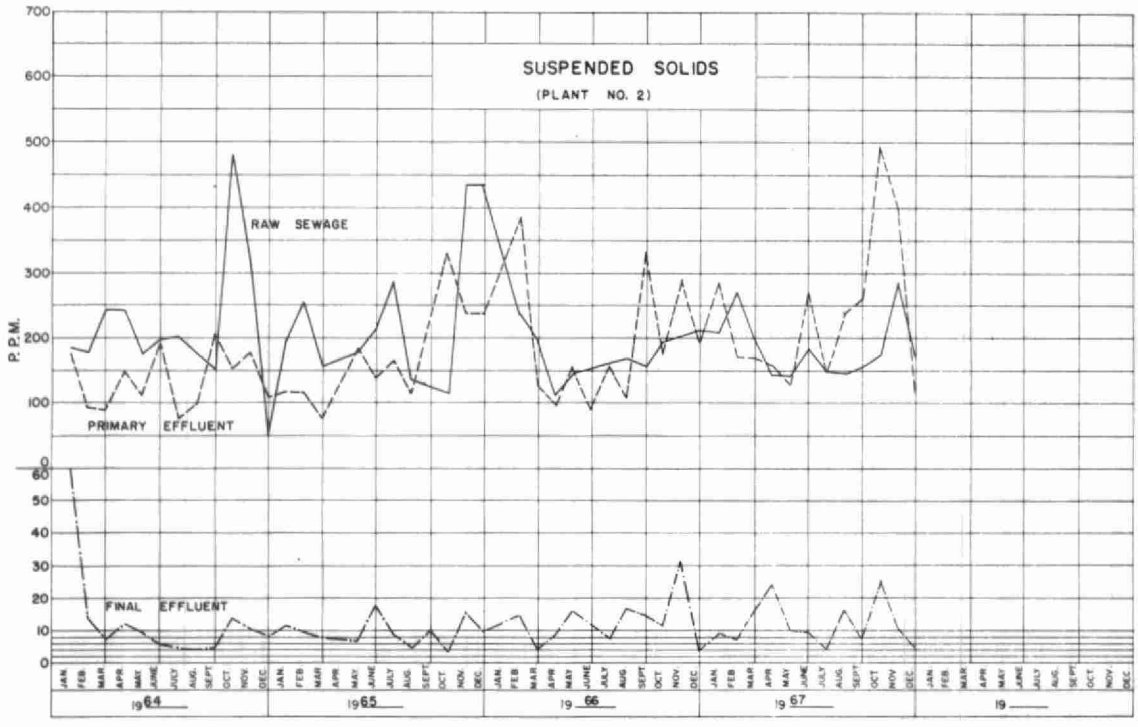


MONTHLY VARIATIONS



B.O.D AND S.S. REMOVAL

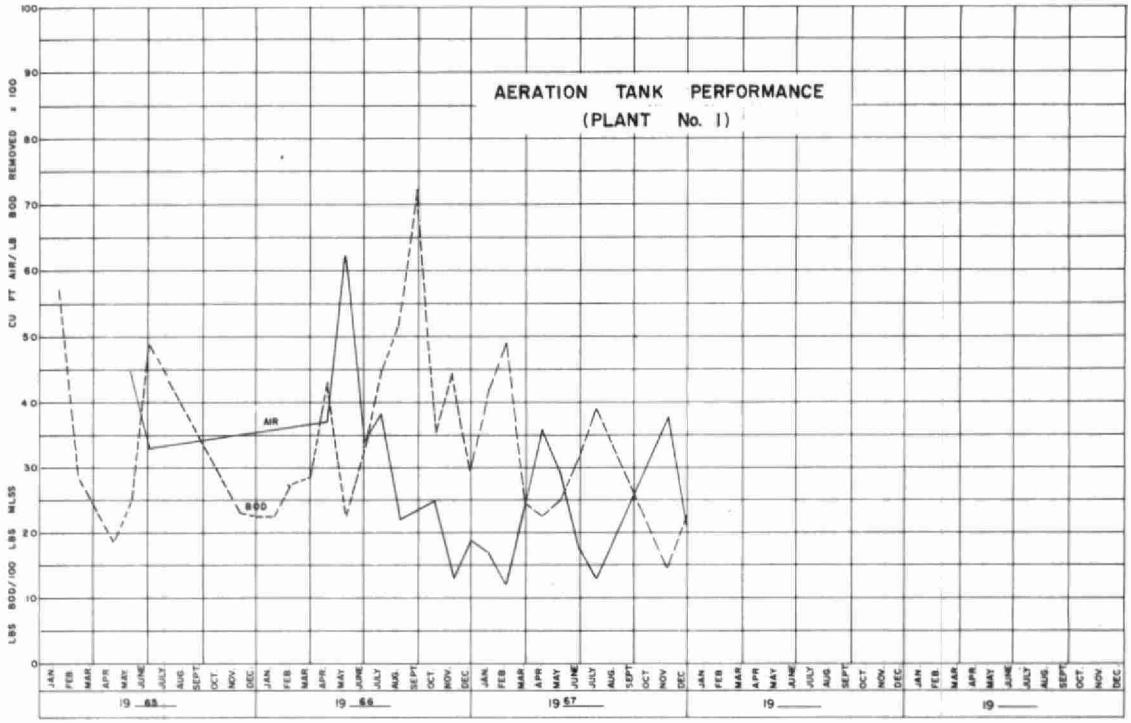
PLANT NO. 2

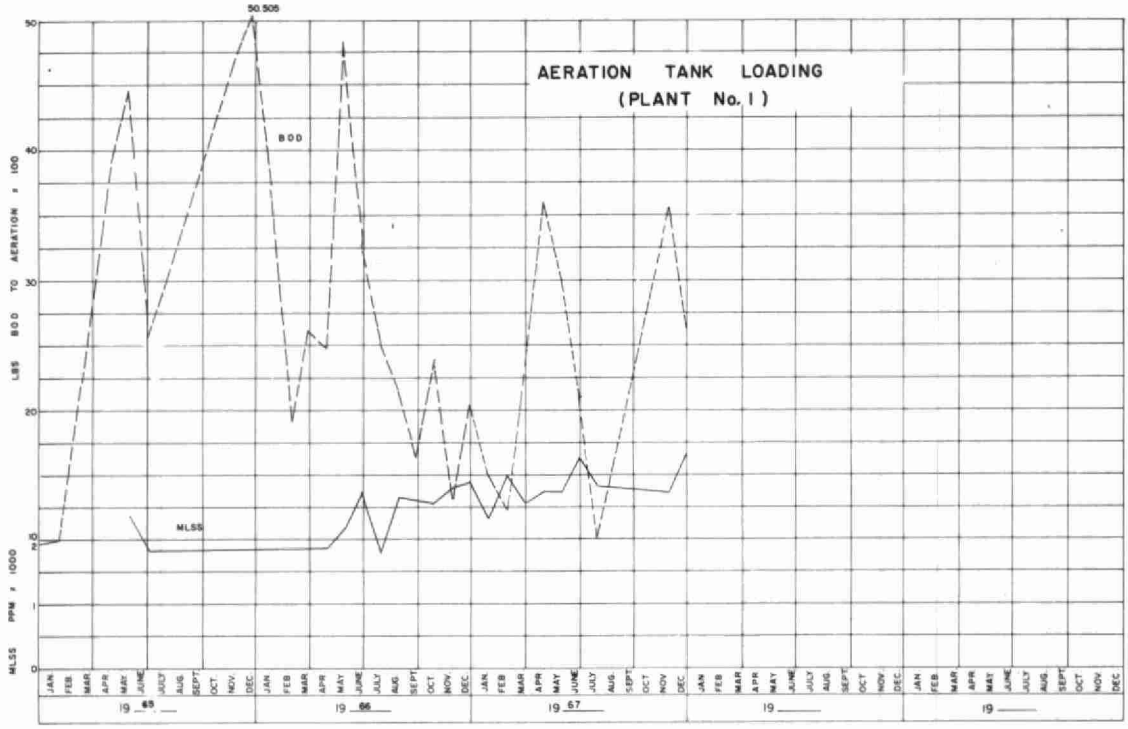
MONTH	B. O. D.				S. S.			
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED
JAN.	276	13.0	95.2	41.24	208	9	95.7	31.21
FEB.	253	17.0	93.3	31.52	272	7	97.4	35.39
MAR.	316	10.7	96.6	54.14	199	16	92.0	32.45
APR.	285	25	91.2	53.69	144	24	83.3	24.78
MAY	237	4.8	98.0	46.48	141	10	92.9	26.22
JUNE	299	4.0	98.7	54.84	181	9	95.0	31.98
JULY	256	3.0	98.8	53.86	149	4	97.3	30.87
AUG.	249	8.2	96.7	60.79	145	16	89.0	33.57
SEPT.	215	8.9	95.9	58.95	156	7	95.5	42.62
OCT.	215	5.2	97.6	59.39	172	25	85.5	41.61
NOV.	513	8.5	98.4	112.16	286	10	96.5	61.36
DEC.	260	4.0	98.5	50.02	158	4	97.5	30.09
TOTAL	-	-	-	677.08	-	-	-	422.15
AVG.	281	9.4	96.5	56.42	184	12	93.1	35.18

COMMENTS

An average organic loading of 281 ppm BOD and 184 ppm SS was received at the new plant in 1966. The average effluent values of 9.4 ppm BOD and 12 ppm SS were within OWRC objectives of 15 ppm.

The BOD of the effluent exceeded the OWRC objective of 15 ppm only 20% of the time and the suspended solids exceeded the objective 22% of the time.


AERATION TANK PERFORMANCE
(PLANT No. 1)
CU FT AIR/LB BOD REMOVED x 100
LBS BOD/100 LBS MLSS
AIR
BOD
19 65
19 66
19 67
19
19


AERATION TANK LOADING
(PLANT No. 1)
50.505
BOD
MLSS
LBS BOD TO AERATION x 100
MLSS PPM x 1000
19 65
19 66
19 67
19
19

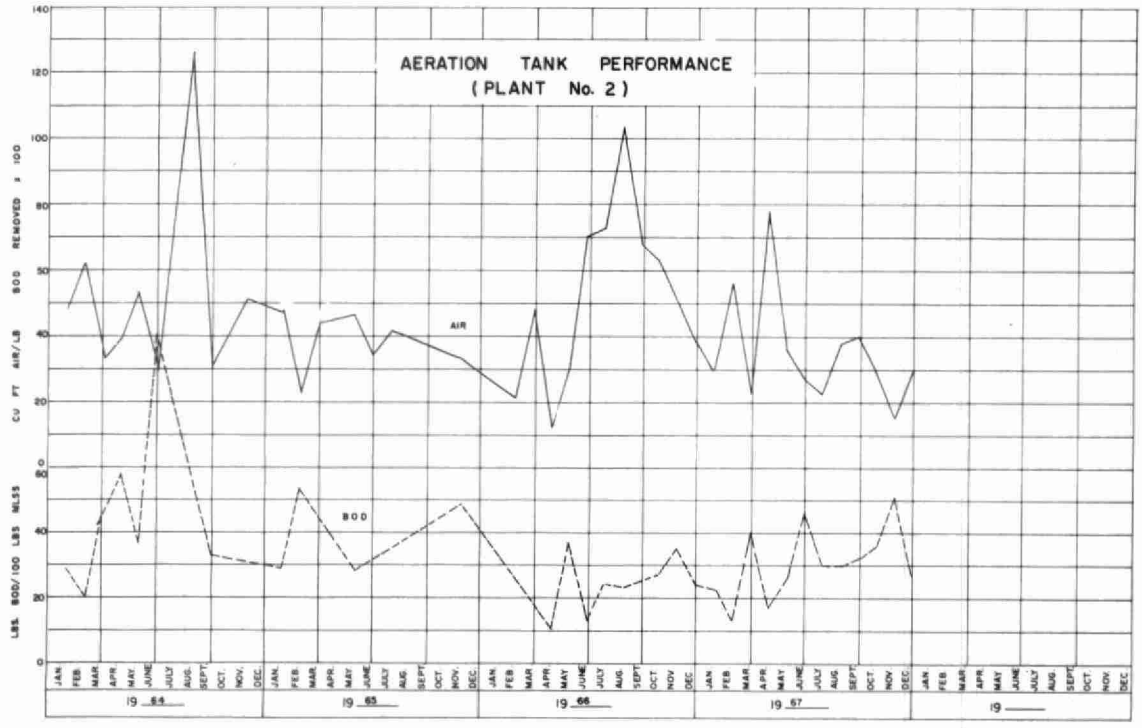
AERATION SECTION

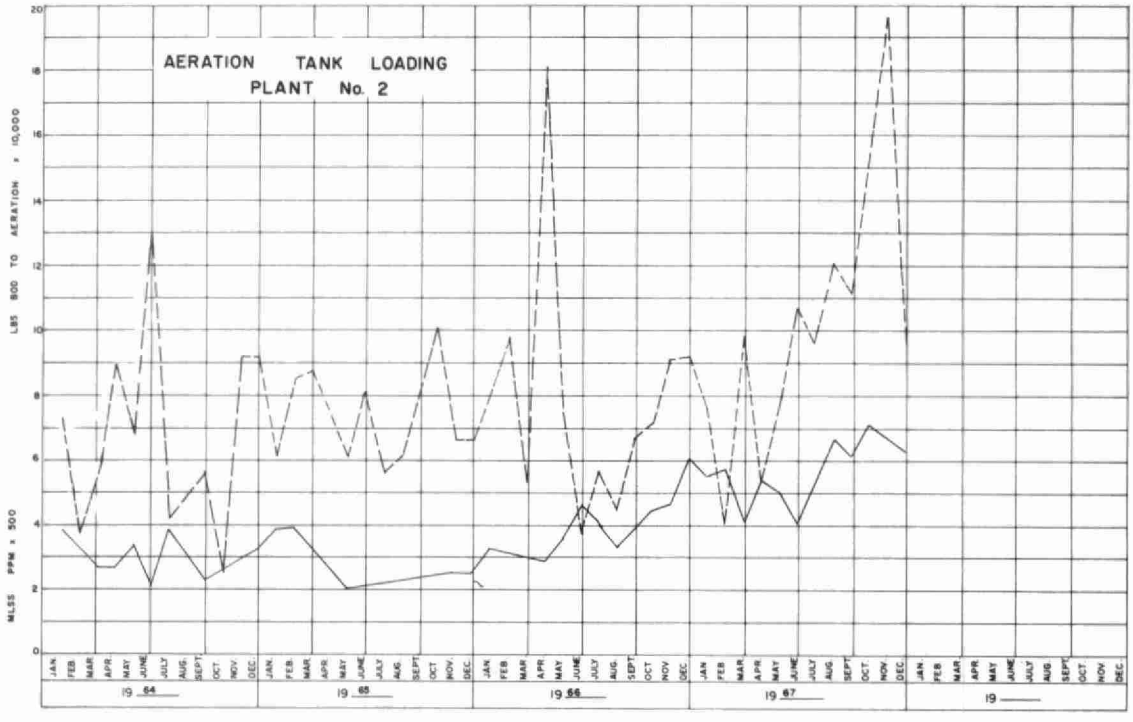
PLANT NO. 1

MONTH	PRIM. EFFL B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	124	2314	17	4184
FEBRUARY	112	3011	12	4937
MARCH	225	2562	24	2420
APRIL	200	2758	36	2261
MAY	173	2736	29	2498
JUNE	149	3265	18	3177
JULY	99	2848	13	3910
AUGUST	-	-	-	-
SEPTEMBER	-	-	-	-
OCTOBER	-	-	-	-
NOVEMBER	328	2735	38	1426
DECEMBER	175	3325	21	2256
TOTAL	-	-	-	-
AVERAGE	176	2839	23	3008

COMMENTS

The average BOD of the primary effluent entering the old plant aeration section was 176 ppm and the average MLSS was 2839 ppm resulting in an average loading of 23 pounds of BOD per 100 lbs. MLSS. An average of 3008 cubic feet of air was supplied per pound of BOD removed.


AERATION TANK PERFORMANCE
(PLANT No. 2)
LBS BOD/100 LBS MLSS CU FT AIR/LB BOD REMOVED x 100
AIR
BOD
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
19 64
19 65
19 66
19 67
19


AERATION TANK LOADING
PLANT No. 2
MLSS PPM x 500
LBS BOD TO AERATION x 10,000
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
19 64
19 65
19 66
19 67
19

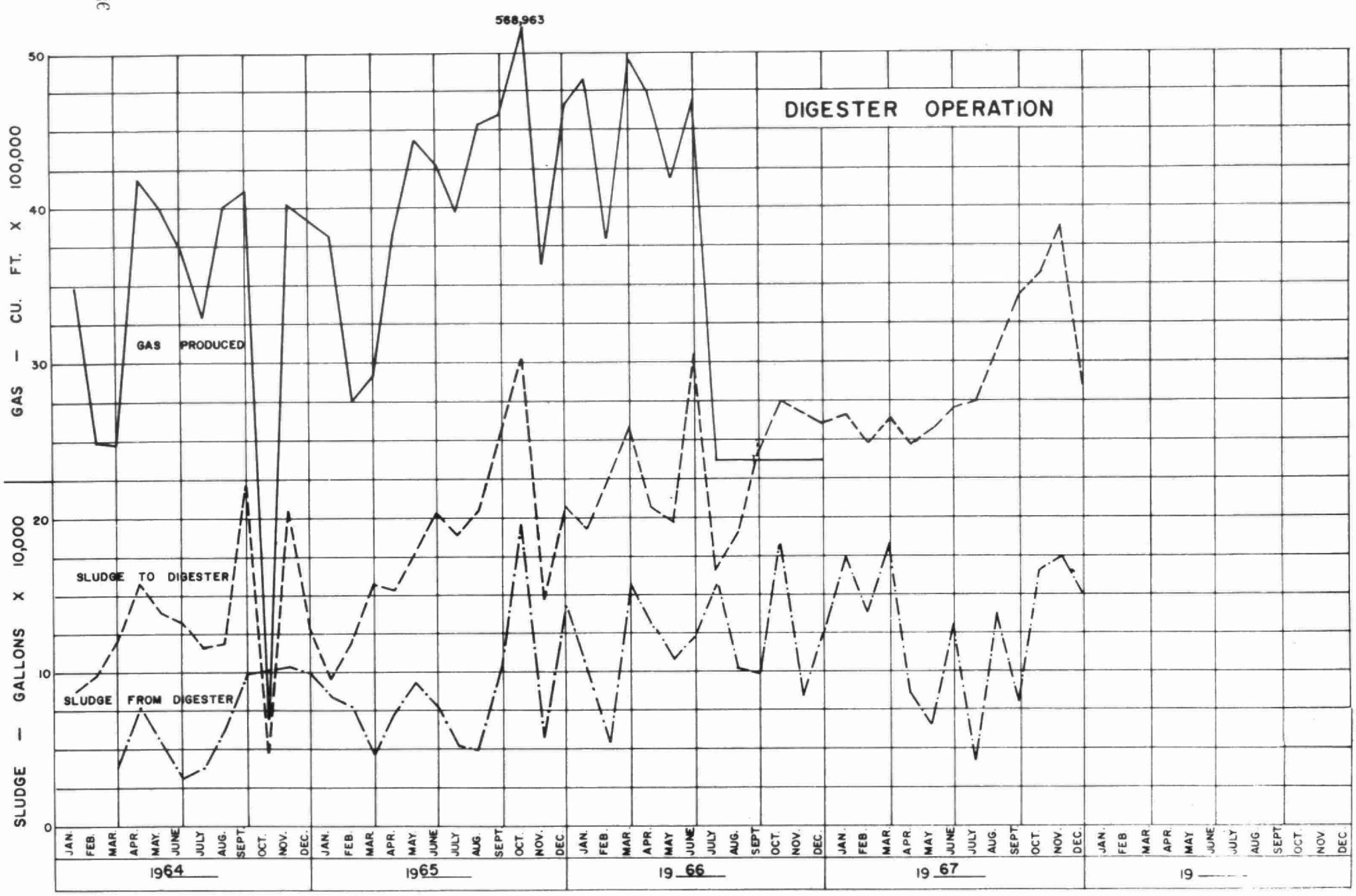
AERATION SECTION

PLANT NO. 2

MONTH	PRIM. EFFL B.O.D. PPM.	M.L.S.S. P.P.M.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB BOD REMOVED
JANUARY	243	2765	23	3094
FEBRUARY	150	2848	13	5673
MARCH	276	2068	40	2372
APRIL	129	2702	17	7821
MAY	195	2514	26	3644
JUNE	290	2064	46	2734
JULY	225	2691	30	2361
AUGUST	238	3353	30	3802
SEPTEMBER	195	3069	32	4056
OCTOBER	272	3570	36	2962
NOVEMBER	443	3350	51	1534
DECEMBER	250	3164	26	2920
TOTAL	-	-	-	-
AVERAGE	242	2847	30	3581

COMMENTS

The average BOD of the primary effluent to the aeration section of the new plant was 242 ppm and the average MLSS was 2847 ppm resulting in an average loading of 30 lbs. of BOD per 100 lbs. of MLSS. An average of 3581 cubic feet of air was supplied per pound of BOD removed.


568,963
DIGESTER OPERATION
GAS PRODUCED
SLUDGE TO DIGESTER
SLUDGE FROM DIGESTER
GAS — CU. FT. X 100,000
SLUDGE — GALLONS X 10,000
50
40
30
20
10
0
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1964
1965
19 66
19 67
19

GRIT REMOVAL AND DIGESTER OPERATION

Month	Sludge to Digesters	Sludge from Digesters	Grit Removed cu. ft.
	Gallons		
January	264,580	174,000	40
February	246,740	137,000	32
March	262,240	181,000	43
April	246,728	85,000	30
May	254,560	65,000	37
June	268,700	129,000	33
July	273,960	42,000	17
August	306,504	138,000	2
September	342,560	80,000	52
October	355,920	165,000	47
November	386,640	174,000	49
December	284,560	148,000	49
Total	3,493,692	1,518,000	431
Average	291,141	126,500	36

COMMENTS

A total of 3,493,692 gallons of raw sludge was pumped to the digester in 1967 as opposed to 2,775,000 gallons in 1966. This is an increase of 26% and is once again indicative of the relatively high organic loading at this plant. The gas metering equipment was not repaired due to excessive costs. A new type of meter will be experimented with at another project and may be installed at Simcoe if the results are satisfactory.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	43.326	-	-
FEBRUARY	37.738	-	-
MARCH	45.756	-	-
APRIL	59.414	298	3.76
MAY	57.407	1278	3.63
JUNE	51.044	2208	4.33
JULY	52.773	1808	7.08
AUGUST	50.490	2206	4.51
SEPTEMBER	57.206	1636	3.18
OCTOBER	56.615	2129	3.89
NOVEMBER	55.414	1633	3.68
DECEMBER	53.998	-	-
TOTAL	621.104	13196	-
AVERAGE	51.758	1885	4.26

COMMENTS

Chlorine is added to the final effluent for disinfection prior to discharge to the Lynn River. Disinfection was practiced for the period from May 11 to November 24. Chlorine was also added to the raw sewage in an effort to reduce odour problems encountered during the period when the local canning industry is processing beans and onions. The chlorinator failed for a total of 9 days during this period. If chlorinator problems continue in 1968, the equipment will be replaced.

CONCLUSIONS

Again in 1967 the combined plants at Simcoe operated efficiently and produced an effluent which met OWRC objectives. The cost per million gallons of $74.04 was within the range normally anticipated for this type of operation.


ONTARIO WATER RESOURCES COMMISSION